

WHAT IS CLAIMED IS:

1. A zoom lens system comprising, in order from an object:

5 a first lens group having positive refractive power;

 a second lens group having negative refractive power;

 a third lens group having positive refractive power; and

10 a fourth lens group having positive refractive power;

 each of the first lens group through the fourth lens group moving such that;

15 when the state of lens group positions varies from a wide-angle end state to a telephoto end state;

 a distance between the first lens group and the second lens group increases;

 a distance between the second lens group and the third lens group decreases; and

20 a distance between the third lens group and the fourth lens group decreases;

 the third lens group including at least two sub-lens groups having positive refractive power;

25 an image being shifted by moving either of the two sub-lens groups as a shift lens group perpendicularly to the optical axis; and

 wherein the following conditional expression is

satisfied:

$$0.120 < DT/ft < 0.245$$

where DT denotes an air space between the most image side lens surface of the first lens group and the most object side lens surface of the second lens group in the telephoto end state, and ft denotes the focal length of the zoom lens system in the telephoto end state.

10 2. The zoom lens system according to claim 1, wherein the following conditional expression is satisfied:

$$0.8 < (1-\beta A) \times \beta B < 3.5$$

15 where βA denotes the lateral magnification of the shift lens group and βB denotes the lateral magnification of the optical elements locating between the shift lens group and an image plane.

20 3. The zoom lens system according to claim 2; wherein the third lens group consists of, in order from the object;

a third A lens group having positive refractive power;

25 a third B lens group having positive refractive power; and

a third C lens group having negative refractive power; and

wherein the shift lens group having positive refractive power is the third B lens group.

4. The zoom lens system according to claim 3,
5 wherein the shift lens group includes at least one
aspherical surface.

5. The zoom lens system according to claim 3,
10 wherein the third A lens group consists of two
positive lenses and one negative lens.

6. The zoom lens system according to claim 3,
wherein the third B lens group consists of one
positive lens and one negative lens.

15 7. The zoom lens system according to claim 2,
wherein the shift lens group includes at least one
aspherical surface.

20 8. The zoom lens system according to claim 1;
wherein the third lens group consists of, in
order from the object;
a third A lens group having positive refractive
power;
25 a third B lens group having positive refractive
power; and
a third C lens group having negative refractive

power; and

wherein the shift lens group having positive refractive power is the third B lens group.

5 9. The zoom lens system according to claim 8,
wherein the shift lens group includes at least one
aspherical surface.

10 10. The zoom lens system according to claim 8,
wherein the third A lens group consists of two
positive lenses and one negative lens.

15 11. The zoom lens system according to claim 8,
wherein the third B lens group consists of one
positive lens and one negative lens.

20 12. The zoom lens system according to claim 1,
wherein the shift lens group includes at least one
aspherical surface.

13. The zoom lens system according to claim 1,
wherein the second lens group includes at least three
negative lenses and one positive lens.

25 14. The zoom lens system according to claim 1,
wherein the fourth lens group includes at least one
aspherical surface having a shape that positive

refractive power becomes weak from the center to the periphery of the lens surface.

15. A zoom lens system comprising, in order from
5 an object:

a first lens group having positive refractive
power;

a second lens group having negative refractive
power;

10 a third lens group having positive refractive
power; and

a fourth lens group having positive refractive
power;

each of the first lens group through the fourth
15 lens group moving such that;

when the state of lens group positions varies
from a wide-angle end state to a telephoto end state;

a distance between the first lens group and the
second lens group increases;

20 a distance between the second lens group and the
third lens group decreases; and

a distance between the third lens group and the
fourth lens group decreases;

the third lens group including at least two sub-
25 lens groups having positive refractive power;

an image being shifted by moving either of the
two sub-lens groups as a shift lens group

perpendicularly to the optical axis.

16. A zoom lens system comprising, in order from an object:

5 a first lens group having positive refractive power;

 a second lens group having negative refractive power;

10 a third lens group having positive refractive power; and

 a fourth lens group having positive refractive power;

 at least the first lens group and the fourth lens group moving to the object side such that when 15 the state of lens group positions varies from a wide-angle end state to a telephoto end state a distance between the first lens group and the second lens group increases, a distance between the second lens group and the third lens group decreases, and a 20 distance between the third lens group and the fourth lens group decreases;

 the third lens group including a first sub-lens group, a second sub-lens group, and a third sub-lens group;

25 the second sub-lens group being arranged to the image side of the first sub-lens group with an air space;

the third sub-lens group being arranged to the image side of the second sub-lens group with an air space;

5 an image being shifted by moving the second sub-lens groups shifting substantially perpendicularly to the optical axis; and

 an aperture stop being arranged in the vicinity of the third lens group, inclusive of inside of the third lens group;

10 wherein the following conditional expressions are satisfied:

$$0.05 < Ds/fw < 0.7$$

$$0.1 < ft/fA < 1.5$$

 where Ds denotes a distance along the optical axis between the aperture stop and the nearest lens surface of the second sub-lens group, fw denotes the focal length of the zoom lens system in the wide-angle end state, fA denotes the focal length of the whole lenses locating to the object side of the second sub-lens group in the telephoto end state, and ft denotes the focal length of the zoom lens system in the telephoto end state.

17. The zoom lens system according to claim 16,
25 wherein the first sub-lens group has positive refractive power and the following conditional expression is satisfied:

$$0.06 < f_a/f_t < 0.2$$

where f_a denotes the focal length of the first sub-lens group.

5 18. The zoom lens system according to claim 17, wherein the second sub-lens group includes at least one positive lens and one negative lens, and has positive refractive power, and wherein the following conditional expression is satisfied:

10 $-0.6 < (n_a/r_a)/(n_b/r_b) < 0$

where r_a denotes a radius of curvature of the most object side lens surface of the second sub-lens group, n_a denotes refractive index at d-line of the most object side lens of the second sub-lens group, r_b denotes a radius of curvature of the most image side lens surface of the second sub-lens group, and n_b denotes refractive index at d-line of the most image side lens of the second sub-lens group.

20 19. The zoom lens system according to claim 18, wherein the third sub-lens group has negative refractive power and the following conditional expression is satisfied:

$$0.5 < |f_c|/f_3 < 0.9$$

25 where f_c denotes the focal length of the third sub-lens group, and f_3 denotes the focal length of the third lens group.

20. The zoom lens system according to claim 19,
wherein the third sub-lens group includes a negative
lens having a concave surface facing to the object
5 locating to the most object side and the following
conditional expression is satisfied:

$$0.5 < |rc|/f_3 < 0.75$$

where rc denotes a radius of curvature of the
negative lens locating to the most object side of the
10 third sub-lens group.

21. The zoom lens system according to claim 17,
wherein the third sub-lens group has negative
refractive power and the following conditional
15 expression is satisfied:

$$0.5 < |fc|/f_3 < 0.9$$

where fc denotes the focal length of the third
sub-lens group, and f_3 denotes the focal length of
the third lens group.

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22. The zoom lens system according to claim 21,
wherein the third sub-lens group includes a negative
lens having a concave surface facing to the object
locating to the most object side and the following
25 conditional expression is satisfied:

$$0.5 < |rc|/f_3 < 0.75$$

where rc denotes a radius of curvature of the

negative lens locating to the most object side of the third sub-lens group.

23. The zoom lens system according to claim 16,
5 wherein the second sub-lens group includes at least one positive lens and one negative lens, and has positive refractive power, and wherein the following conditional expression is satisfied:

$$-0.6 < (na/ra) / (nb/rb) < 0$$

10 where ra denotes a radius of curvature of the most object side lens surface of the second sub-lens group, na denotes refractive index at d-line of the most object side lens of the second sub-lens group, rb denotes a radius of curvature of the most image side lens surface of the second sub-lens group, and nb denotes refractive index at d-line of the most image side lens of the second sub-lens group.
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24. The zoom lens system according to claim 23,
20 wherein the third sub-lens group has negative refractive power and the following conditional expression is satisfied:

$$0.5 < |fc|/f3 < 0.9$$

25 where fc denotes the focal length of the third sub-lens group, and $f3$ denotes the focal length of the third lens group.

25. The zoom lens system according to claim 24,
wherein the third sub-lens group includes a negative
lens having a concave surface facing to the object
locating to the most object side and the following
5 conditional expression is satisfied:

$$0.5 < |rc|/f_3 < 0.75$$

where rc denotes a radius of curvature of the
negative lens locating to the most object side of the
third sub-lens group.

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26. The zoom lens system according to claim 16,
wherein the third sub-lens group has negative
refractive power and the following conditional
expression is satisfied:

15 $0.5 < |fc|/f_3 < 0.9$

where fc denotes the focal length of the third
sub-lens group, and f_3 denotes the focal length of
the third lens group.

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27. The zoom lens system according to claim 26,
wherein the third sub-lens group includes a negative
lens having a concave surface facing to the object
locating to the most object side and the following
conditional expression is satisfied:

25 $0.5 < |rc|/f_3 < 0.75$

where rc denotes a radius of curvature of the
negative lens locating to the most object side of the

third sub-lens group.

28. A zoom lens system comprising, in order from an object:

5 a first lens group having positive refractive power;

 a second lens group having negative refractive power;

10 a third lens group having positive refractive power; and

 a fourth lens group having positive refractive power;

 at least the first lens group and the fourth lens group moving to the object side such that when 15 the state of lens group positions varies from a wide-angle end state to a telephoto end state a distance between the first lens group and the second lens group increases, a distance between the second lens group and the third lens group decreases, and a 20 distance between the third lens group and the fourth lens group decreases;

 the third lens group including a first sub-lens group, a second sub-lens group, and a third sub-lens group;

25 the second sub-lens group being arranged to the image side of the first sub-lens group with an air space;

the third sub-lens group being arranged to the image side of the second sub-lens group with an air space;

5 an image being shifted by moving the second sub-lens groups shifting substantially perpendicularly to the optical axis; and

 an aperture stop being arranged in the vicinity of the third lens group including inside of the third lens group;

10 wherein the following conditional expressions are satisfied:

$$0.05 < Ds/fw < 0.7$$

 where Ds denotes a distance along the optical axis between the aperture stop and the nearest lens 15 surface of the second sub-lens group, and fw denotes the focal length of the zoom lens system in the wide-angle end state.